Hotwire®

8799
TDM SHDSL Line Card

7995/7996
TDM SHDSL Endpoints

FEATURES

- Standard G.shdsl (ITU G.991.2) support for improved reach/speed and greater interoperability
- Fast and cost-effective provisioning of E1 and Nx64 Kbps services
- Industry-standard line card interfaces: V.35 (only on CPE) and G.703/704
- On-board DS0 cross-connect functionality
  - — Grooms up to eight fractional circuits onto single E1
  - — Maps separate DS0s to specific voice or data circuits
- Minimizes cost of using Telco resources
- Uses existing copper loop infrastructures
- Efficient single wire pair usage
- NEBS certified
- Eight-port line card for 136 TDM SHDSL lines per Hotwire GranDSLAM
- TDM endpoints are available with G.703 or EIA-530A (V.35, X.21, RS449) interfaces
- Autorate installation maximizes data rate based on loop conditions
- Centralized SNMP management via Hotwire GranDSLAM

Continues on back

Powerful Channelized DSL Solutions with Cross-Connect and Grooming

Paradyne's Hotwire TDM SHDSL system offers next-generation channelized services with powerful, cost-effective DS0 cross-connect and grooming functionality. This line card provides an attractive platform for service providers to offer additional E1 or Nx64K services, while reducing connection cost at the central office (CO).

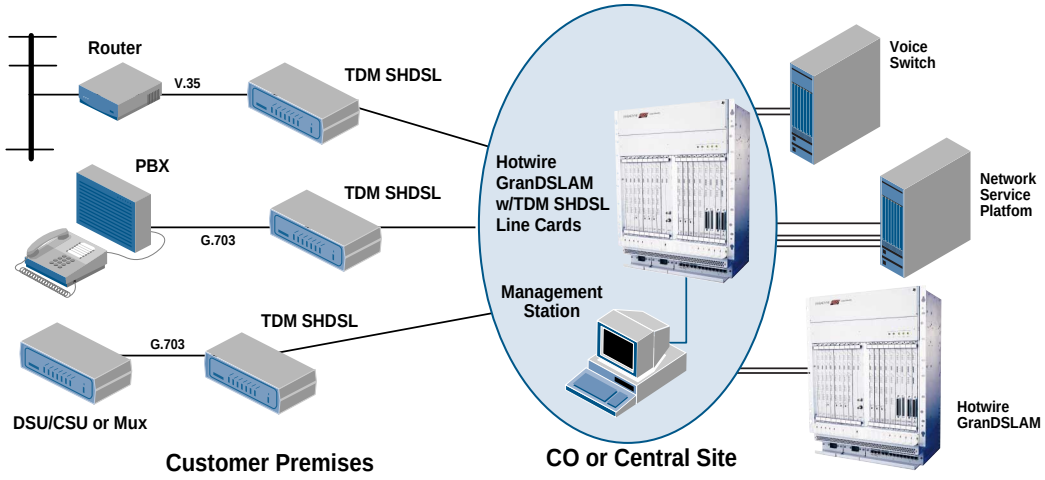
The 8-port Hotwire 8799 TDM SHDSL Line Card enables service providers to provision up to 136 E1 or Nx64K lines from a single Hotwire GranDSLAM chassis. It allows service providers to run channelized E1 or Nx64K services to their local loop subscribers while efficiently multiplexing TDM traffic via DS0 cross-connect functions directly on the line card. This on-board multiplexing functionality provides greater flexibility in the number of customer services that can be offered, while reducing connection fees into the Telco network infrastructure, such as DACS or MUX port costs.

The Hotwire TDM SHDSL solution provides premium performance, exceptional noise immunity, and extraordinary loop reach with line rates ranging from 200 Kbps up to 2.3 Mbps. These selectable line rates empower service providers to create high-bandwidth service offerings or select the proper speed for distance-sensitive deployments, thereby reaching close to 100 percent of the subscriber base.

PARADYNE®

first at what's next™

Paradyne's Hotwire channelized DSL products are deployed worldwide today. Service providers and network operators realize the amazing value and cost savings that these products afford them. TDM SHDSL can be deployed in the typical central office configuration as seen below with numerous TDM devices connected over the local loop to the Hotwire GranDSLAM chassis. The Hotwire GranDSLAM also has the unique ability to have the TDM SHDSL line cards configured to talk in a GranDSLAM-to-GranDSLAM solution.



For smaller installations, the Hotwire TDM SHDSL Endpoints can also be configured to talk with other Hotwire TDM SHDSL Endpoints in an endpoint-to-endpoint configuration, as seen in the router connections below. This endpoint-to-endpoint configuration, using the V.35 interface, also allows for an additional extended speed of 2.3 Mbps to be achieved while the TDM SHDSL Line Cards' highest speeds are based on the industry's E1 standards of 2.048 Mbps.

DSL Everywhere

Hotwire TDM SHDSL is deployed from the same Hotwire GranDSLAM that supports the provisioning of Paradyne's complete family of multiservices line cards, consisting of today's commercial-grade ADSL (DMT/G.lite), RADSL, IP SDSL, ATM SDSL, IP ReachDSL™ and IP IDSL. Paradyne delivers the only DSLAM in the industry able to support this broad range of services from a single platform, with this centralized power forming the core of Paradyne's "DSL Everywhere" deployment strategy. The Hotwire GranDSLAM allows service providers to deploy ADSL (DMT/G.lite) and SHDSL to standards-compliant customers, IDSL for customers residing behind digital loop carriers (DLCs), TDM SHDSL for traditional Nx64K services, and ReachDSL to provision DSL services over poor quality or extra long POTS loops. "DSL Everywhere" means never having to say NO to your customer requests for DSL again – the Paradyne advantage.

Product Description

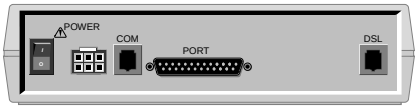
The Hotwire 8799 Line Card supports an E1 G.703 interface connection. It is designed for either the Hotwire 8810 or 8610 stackable DSLAM or Hotwire 8820 or 8620 GranDSLAM to enable service provisioning by transporting signals at high speeds over a twisted-pair connection. The Hotwire 8799 Line Card was designed to operate with Paradyne's Hotwire 7995 and 7996 TDM SHDSL Endpoints.

The Hotwire 8799 TDM SHDSL Line Card offers these standard features:

- Embedded Operations Channel (EOC) – Provides non-intrusive remote management via SNMP or Telnet session over the DSL network.
- SNMP Management – Provides industry-standard SNMP network management.
- Local Management – Provides local management with a Terminal or PC via the Serial management port or the 10Base-T management port of the Hotwire GranDSLAM.
- Remote Management – Provides remote management out-of-band, using an external modem through the Serial management port of the Hotwire GranDSLAM. SNMP or Telnet can be used through the 10Base-T port.
- Alarm Indication – Easily identifiable front-panel LEDs and SNMP trap generation.
- Diagnostics – Provides the capability to diagnose device/network problems and perform loopbacks, pattern tests, and self-test.
- Device and Test Monitoring – Provides the capability of tracking and evaluating the unit's operation, including health and status and error-rate monitoring. Test Status, Network Error Statistics, DSL Performance Statistics, G.703 Statistics and Display LEDs.
- Loopbacks – Supports a full suite of loopbacks, including line loopbacks, data terminal loopbacks and repeater loopbacks. Loopbacks may be initiated locally or remotely.
- Performance Statistics – Provides statistics on the performance of the DSL link.

The Hotwire 7995/7996 TDM SHDSL Endpoints

The Hotwire TDM SHDSL solution offers two different endpoints to connect customers to high-speed TDM services – one with a G.703 and one with an EIA-530A interface. The industry-standard EIA-530A interface is configurable as a V.35, X.21 or RS-449 connection. The G.703 interface will carry 2.048 Mbps, and the EIA-530A connection transfers data up to 2.304 Mbps. The TDM SHDSL Endpoints are powered by 100-240 V AC, +24 V DC, or -48 V DC, allowing the units to be directly powered at the CO or at cell sites. These endpoints can be configured and managed via EOC (see above), SNMP, or menu-driven VT100 compatible Asynchronous Terminal Interface (ATI), either locally or remotely.



Hotwire 7995 (EIA-530A) Back Panel

Hotwire 7996 (G.703) Back Panel

Hotwire TDM SHDSL products are equipped with an autorate capability that identifies the maximum line rate supported by the copper loop. This powerful automatic configuration capability makes installation and service provisioning simple and painless. Further flexibility is provided in the ability to manually set the maximum endpoint speed at different levels for different customer-tailored service offerings, even though the line will run faster. An EOC provides non-intrusive functions such as firmware and configuration file downloads, Telnet, and SNMP to the TDM SHDSL Endpoints.

Network Management Solution

The Hotwire TDM SHDSL solutions offer service providers extensive management capabilities. The entire Hotwire family is managed using Paradyne's OpenLane® Service Level Management Solution, a Web-based management application that provides configuration control, health and status checking, diagnostic troubleshooting tools, and real-time and history performance monitoring displays. OpenLane interoperates with standard management platforms such as HP OpenView and Tivoli NetView in NT and/or UNIX Sun environments. On-site maintenance cost and customer interruptions are reduced through the ease and power of OpenLane's Web-browser-based user interface.

Advanced Cross-Connect Functionality

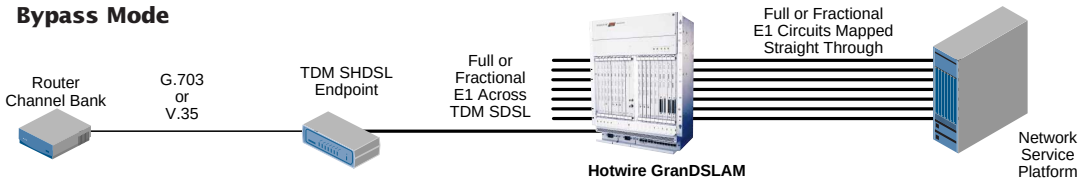
TDM SHDSL is an excellent, cost-effective solution for carrying data through the Telco or PTT network infrastructure. Additionally, there are virtually unlimited applications for use in private networks, such as government and educational campus environments. Typical applications involve Layer 1 transport of TDM traffic – voice, video and data – across twisted-pair copper wiring. Because this is a Layer 1 transport, it supports transmission of virtually all protocols, including IP, PPP, frame relay and ATM. Service providers, including ILECs, CLECs, and PTTs, quickly realize significant cost savings when using TDM SHDSL products for provisioning of E1 and Nx64K services to their business customers.

The Hotwire 8-port TDM SHDSL Line Card with cross-connect features adds unprecedented functionality to streamline current E1/Nx64K service deployments. Line cards can be configured with up to eight DSL ports cross-connected to any or all of the eight DTE ports. Each G.703/704 port can be configured to carry a maximum of 31 user payload DS0s. The cross-connect features are configurable in three different modes:

1) **Bypass Mode** – Bypasses the cross-connect feature and allows the direct mapping of TDM SHDSL ports to a DTE port in a one-to-one fashion.
2) **DS0 Aggregation** – Fractional E1 services deployed to customers are aggregated onto a single E1 circuit into the service provider's network.
3) **DS0 Segmentation** – Allows the segmentation of individual DS0s for mapping onto a specific E1 circuit into the service provider's network.

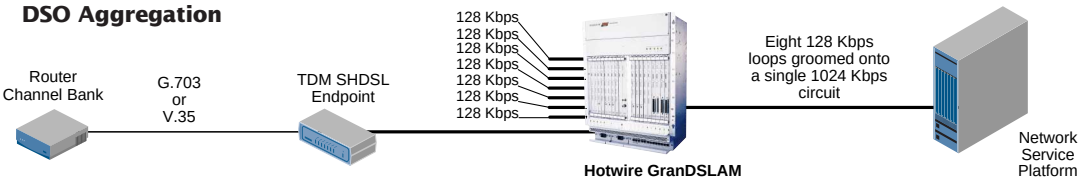
Bypass Mode

The card is highly flexible and can be configured to operate with or without the cross-connect functionality. Bypass mode, the default condition, disregards the internal cross-connect function and directly maps each DSL port to the appropriate DTE port. For example, DSL port 1 maps directly to DTE port 1, DSL port 2 maps directly to DTE port 2, etc.



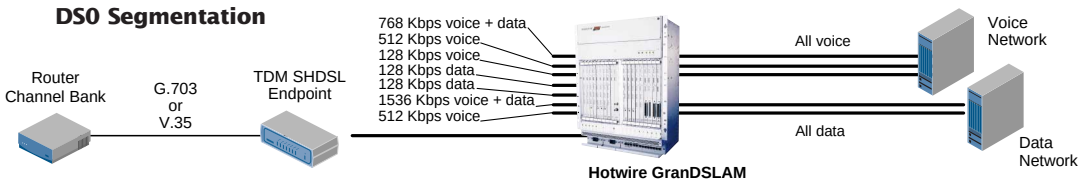
DS0 Aggregation

One of the most unique and exciting features in this card is the DS0 cross-connect functionality. Below is an example of DS0 Aggregation in which fractional E1 services are deployed to the DSL subscribers. In this example, the DSLAM card "grooms" the DS0s from up to eight different DSL subscribers onto a single G.703 interface for connection into a network service platform, such as a DACS system. This feature provides a substantial cost savings for the service provider by minimizing the number of DACS ports required for interconnection.



DS0 Segmentation

Additionally, the new 8-port line card has the ability to segment DS0s by mapping individual DS0s from each DSL customer to multiple G.703 DTE ports. For example, when customers are running mixed voice and data across the DSL loop, the card can be configured to segment all the voice DS0s into one G.703 DTE port and all the data DS0s into a separate G.703 DTE port. Below is an example of DSL connections carrying mixed voice and data payloads on various fractional E1 customer loops. The line card can be configured to segment the voice DS0s together and all the data DS0s together.



Technical Support Programs

Paradyne offers post-sale technical support programs to make maintaining, growing and upgrading your network easy. Software maintenance, access to technical help online, and a fully-staffed technical support center are a few of the highlights. Please see www.paradyne.com/tech_support/programs.html for further details.

FEATURES

- SHDSL provides superior performance and widest market coverage compared to other standards-based DSL technologies
- Domestic and international regulatory certifications including CE Mark
- TDM SHDSL Endpoints can interoperate in an endpoint-to-endpoint configuration
- TDM SHDSL Line Cards allow for a unique Hotwire GranDSLAM-to-GranDSLAM configuration
- Firmware downloadable for simplified future upgrades and investment protection

SPECIFICATIONS

STANDARDS COMPLIANCE

- Line coding:
  - G.shdsl: ITU G.991.2 and G.994.1
  - Customer and network protection: UL, CSA, TUV, FCC Part 15 A, CISPR22 A, EN 60950, EN 50092-1, ANSI, ITU-T, VCCI, CE Mark, NEBS Level 3 (8799)

SYSTEM CLOCK

- E1: Accuracy per G.823, CTR12/13, and ETS 300011, Initial Holdover Stability per G.812, Type VI Clock

TRANSMISSION

- DSL transceiver: GlobeSpan
- DSL line rates: 200 Kbps to 2.3 Mbps in increments of 64 Kbps
- Maximum transmit power: 13.5 dBm at max. line rate
- Media: One unshielded, non-loaded twisted copper pair
- Termination impedance: 135 ohms (nominal)

DSL INTERFACE

- Physical Interface (DSLAM): 50-pin Telco connector (one per slot)

PAYLOAD

- Data Rates:
  - 8799: Up to 2.048 Mbps (Nx64 Kbps subrates supported, N=1-32)
- Framing:
  - 8799: CRC4 or no CRC4, AMI or HDB3 line coding

CUSTOMER INTERFACE

- Physical Interfaces:
  - 8799: G.703 (50-pin Telco connector, optional conversion cable to [8] 8-pin modular for 120 ohm or [16] BNC for 75 ohm)
  - 7995: EIA-530A (V.35, X.21 or RS-449)
  - 7996: G.703 (8-pin modular for 120 ohm, BNC for 75 ohm)

NETWORK MANAGEMENT

- SNMP Managed
- Supports MIB II (RFC 1213 and RFC 1573), DS1/E1 MIB (RFC 2495), RS-232-Like MIB (RFC 1659), and Enterprise MIB
- Local loopbacks (LLB, DLB, RLB)
- Remote loopbacks (LLB)
- DSLAM interface: Ethernet (IEEE 802.3) 10Base-T and craft access terminal (Serial) port V.24 (EIA-232), VT100 compatible terminal, 8-pin modular connector

DIMENSIONS (H x W x D)

- Line Card: 12.3 in. x 0.8 in. x 10 in. (31.1 cm x 2.0 cm x 25.4 cm)
- Endpoints: 2.0 in. x 8.7 in. x 6.2 in. (5 cm x 22 cm x 16 cm)

ELECTRICAL

- 8799:
  - Contains DC-to-DC converter that requires -48 V power input. The -48 V power is distributed through the Hotwire DSLAM backplane.
- 7995/7996:
  - Input: 100-240 V AC, .07A, 50/60 Hz
  - Output: 24 V DC 1.25A

PHYSICAL ENVIRONMENT

- Operating temperature: 32˚ to 140˚ F (0˚ to 60˚ C)
- Storage temperature: -40˚ to 158˚ F (-40˚ to 70˚ C)
- Relative humidity: 5% to 95% noncondensing
- Shock and vibration: Withstands normal shipping and handling

For additional information on this or any Paradyne product or service, contact the office nearest you; or dial toll-free (USA) 800 PARADYNE or call 727 530-8623. Fax (USA) 727 530-8216. Paradyne Web Site: **www.paradyne.com**

Asia Pacific: 65 355-5233, Fax 65 355-5244
Japan: 81-3-5437-5388, Fax 81-3-5437-5389
China: 8610 6500-6467, Fax 8610 6500-6471
Korea: 82 2 559 0777, Fax 82 2 559 0700
Singapore: 65-476-6103, Fax 65-476-6102
United Kingdom: 44 1635 869721, Fax 44 1635 871121
Canada: 905-947-4567, Fax 905-415-0332
Caribbean/Latin America: 1-727-530-8420, Fax 1-727-532-5240
Middle East and Africa: 20-2-3369894, Fax 20-2-3369893
France: 33 4 92 38 48 01, Fax 33 4 92 38 48 08
Germany: 49 201 871899-3, Fax 49 201 871899-4

Specifications subject to change without notice; see Paradyne Web Site for the most current information.
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